WHAT IS CLAIMED IS:

1. A vertical cavity laser array device, comprising:

a) a substrate;

b) a bottom dielectric stack reflective to light over a predetermined range of wavelengths and being disposed over the substrate;

c) an active region for producing laser light;

d) a top dielectric stack spaced from the bottom dielectric stack and reflective to light over a predetermined range of wavelengths;

e) the active region includes one or more periodic gain region(s) and spacer layers disposed on either side of the periodic gain region(s) and arranged so that the periodic gain region(s) is aligned with the antinodes of the device's standing wave electromagnetic field;

f) means for modulating the properties of the periodic gain region(s) at spaced locations so as to provide an array of spaced laser pixels which have higher net gain than the interpixel regions; and

g) the spaced laser pixels having the same or different sizes and the spacings between pixels having the same or different lengths to cause the output of the vertical cavity laser array device to produce single or multimode laser output.

2. The vertical cavity laser array device of claim 1 wherein the array providing means includes a plurality of spaced apart absorbing elements selected to absorb the pump beam light.

3. The vertical cavity laser array device of claim 1 wherein the array providing means includes altering the emissive properties of the periodic gain region(s) at spaced apart locations.

4. The vertical cavity laser array device of claim 3 wherein the emissive properties are altered by high intensity UV radiation.

5. The vertical cavity laser array device of claim 1 wherein pump-beam light is transmitted and introduced into the active region through at least one of the dielectric stacks.

6. The vertical cavity laser array device of claim 1 wherein one or more periodic gain region(s) is a combination of an organic host material and a dopant and the spacer layers are substantially transparent to pump-beam light and laser light.

7. The vertical cavity laser light producing device of claim 6 wherein the host material is aluminum tris(8-hydroxyquinoline), the dopant is [4-(dicyanomethylene)-2-t-butyl-6-(1,1,7,7-tetramethyljulolidyl-9-enyl)-4H-pyran], and the spacer layers includes 1,1-Bis-(4-bis(4-methyl-phenyl)-amino-phenyl)-cyclohexane or silicon dioxide.

8. The vertical cavity laser light producing device of claim 1 wherein the periodic gain region includes polymeric materials.

9. The vertical cavity laser array device of claim 1 wherein the spacing between pixels is in the range of 0.25 to 4 microns.

10. The vertical cavity laser array device of claim 1 wherein the size of the pixels is in the range of 2.5 to 20 microns.

11. The vertical cavity laser array device of claim 1 wherein the pixels are arranged in a linear array.

12. The vertical cavity laser array device of claim 1 wherein the pixels are arranged in a periodic two-dimensional array.

13. The vertical cavity laser array device of claim 1 wherein the pixels are arranged randomly in a two-dimensional array.

14. A vertical cavity laser light producing device, comprising:

a) a substrate;

b) a first dielectric stack reflective to light over a predetermined range of wavelengths and being disposed over the substrate;

c) an active region for producing laser light;

d) a metallic layer spaced from the first dielectric stack and reflective to light;

e) the active region includes one or more periodic gain region(s) and spacer layers disposed on either side of the periodic gain region(s) and arranged so that the periodic gain region(s) is aligned with the antinodes of the device's standing wave electromagnetic field;

f) means for modulating the properties of the periodic gain region(s) at spaced locations so as to provide an array of spaced laser pixels which have higher net gain than the interpixel regions; and

g) the spaced laser pixels having the same or different sizes and the spacings between pixels having the same or different lengths to cause the output of the vertical cavity laser array device to produce single or multimode laser output.

15. The vertical cavity laser array device of claim 14 wherein the array providing means includes a plurality of spaced apart absorbing elements selected to absorb the pump beam light.

16. The vertical cavity laser array device of claim 14 wherein the array providing means includes altering the emissive properties of the periodic gain region(s) at spaced apart locations.

17. The vertical cavity laser array device of claim 16 wherein the emissive properties are altered by high intensity UV radiation.

18. The vertical cavity laser array device of claim 14 wherein pump-beam light is transmitted and introduced into the active region through at least one of the dielectric stacks.

19. The vertical cavity laser array device of claim 14 wherein one or more periodic gain region(s) is a combination of an organic host material and a dopant and the spacer layers are substantially transparent to pump-beam light and laser light.

20. The vertical cavity laser light producing device of claim 19 wherein the host material is aluminum tris(8-hydroxyquinoline), the dopant is [4-(dicyanomethylene)-2-t-butyl-6-(1,1,7,7-tetramethyljulolidyl-9-enyl)-4H-pyran], and the spacer layers includes 1,1-Bis-(4-bis(4-methyl-phenyl)-amino-phenyl)-cyclohexane or silicon dioxide.

21. The vertical cavity laser light producing device of claim 14 wherein the periodic gain region includes polymeric materials.

22. The vertical cavity laser array device of claim 14 wherein the spacing between pixels is in the range of 0.25 to 4 microns.

23. The vertical cavity laser array device of claim 14 wherein the size of the pixels is in the range of 2.5 to 20 microns.

24. The vertical cavity laser array device of claim 14 wherein the pixels are arranged in a linear array.

25. The vertical cavity laser array device of claim 14 wherein the pixels are arranged in a periodic two-dimensional array.

26. The vertical cavity laser array device of claim 14 wherein the pixels are arranged randomly in a two-dimensional array.